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species distributed among eight genera. The vascular system of the primary root and hypocotyl is typically tetrarch and corresponds with two bundles from each cotyledon without change of position. In some species the root is hexarch; in others, variable and anomalous. The occurrence of the hexarch type led the author to suspect that a central cotyledonary trace, such as is found in some species of *Diospyros*, had aborted, but no sign of this could be found. In *Bumelia tenax* the root is usually hexarch. In the upper part of the root and the hypocotyl, four of these bundles differ from the other two in that from them alone rise the lateral rootlets, and also in that they alone are continuous with the bundles of the cotyledons.—W. J. G. LAND.

**Fungus excreta.**—A condition almost like that in successive cultures of the higher plants is reported for certain fungi by LUTZ.<sup>28</sup> He finds that in nutritive solutions in which various molds (*Aspergillus*, *Botrytis*, *Cladosporium*, *Fusarium*, *Mucor*, *Penicillium*) have been grown, there are produced substances which retard or accelerate the germination and growth of the same or other species. These products have much in common with enzymes; they are destroyed by high temperatures (80–100° C.); their action is weakened by dilution, ceasing usually at about 20-fold; they are destroyed in sunlight (20 hours), the violet rays being most efficient. Some of these substances may be stopped by a clay filter, but some pass through. The agents which accelerate growth and development are formed in lighted cultures, especially those of *Fusarium* and *Aspergillus*.—C. R. B.

**Chemotropism of fungi.**—As part of the larger subject, parasitism, SCHMIDT has investigated the chemotropism of an unknown species of *Phyllosticta*, parasitic on pear leaves.<sup>29</sup> He is apparently ignorant of FULTON's work on this subject,<sup>30</sup> and with experimentation that is open to serious objection, comes to the conclusion that this plant is positively chemotropic. Its chemotropism, however, is not supposed to come into play at once, "but the fungus itself must first, by enzymatic, toxic, or purely mechanical means, so alter the normal structure of the epidermal cell as to set free a diffusion stream, counter to which, as a directive stimulus, the further growth of the fungus proceeds." This view he promises to support in a second paper.—C. R. B.

**Culture solutions.**—Any who are interested in water-cultures should consult a recent paper by BENECKE,<sup>31</sup> who has been testing the efficiency of VON DER CRONE's solution, in comparison with the older ones. VON DER CRONE proposed in 1904 a solution nearly like SACHS's, except in the addition of the iron as ferrous

<sup>28</sup> LUTZ, OTTO, Ueber den Einfluss gebrauchter Nährlösungen auf die Keimung und Entwicklung einiger Schimmelpilze. Ann. Mycol. 7:91–133. 1909.

<sup>29</sup> SCHMIDT, E. W., Ueber den Parasitismus der Pilze. Zeit. Pflkrankh. 19:129–143. figs. 7. 1908.

<sup>30</sup> BOT. GAZETTE 41:81–108. 1906.

<sup>31</sup> BENECKE, W., Die von der Cronesche Nährsalzlösung. Zeits. Bot. 1:235–252. 1909.